

What Is Claimed Is:

1 1. An isolated nucleic acid molecule encoding a
2 Plasmodium sp. chitinase.

1 2. The isolated nucleic acid molecule of claim 1
2 wherein said nucleic acid is deoxyribonucleic acid.

1 3. The isolated nucleic acid molecule of claim 2
2 wherein said deoxyribonucleic acid is cDNA.

1 4. The isolated nucleic acid molecule of claim 1
2 wherein said nucleic acid molecule has a nucleotide
3 sequence as shown in SEQ ID NO:1 or SEQ ID NO:2.

1 5. The isolated nucleic acid molecule of claim 1
2 wherein said nucleic acid molecule encodes an amino acid
3 sequence as shown in SEQ ID NO:3 or SEQ ID NO:4.

1 6. The isolated nucleic acid molecule of claim 1
2 wherein said nucleic acid is ribonucleic acid.

1 7. The isolated nucleic acid molecule of claim 6
2 wherein said ribonucleic acid is mRNA.

1 8. An oligonucleotide complementary to at least a
2 portion of the mRNA of claim 7.

1 9. A cell comprising the oligonucleotide of claim
2 8.

1 10. An expression vector comprising the
2 oligonucleotide of claim 8.

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1 11. The expression vector of claim 10 wherein the
2 expression vector is selected from the group consisting
3 of a plasmid and a virus.

1 12. A cell comprising the expression vector of
2 claim 10.

1 13. A method of decreasing expression of a
2 Plasmodium sp. chitinase in a host cell, said method
3 comprising introducing the oligonucleotide of claim 8
4 into the cell, wherein said oligonucleotide blocks
5 translation of said mRNA so as to decrease expression of
6 said Plasmodium sp. chitinase in said host cell.

1 14. A cell comprising the nucleic acid molecule of
2 claim 1.

1 15. An expression vector comprising the nucleic
2 acid molecule of claim 1.

1 16. The expression vector of claim 15 wherein said
2 expression vector is selected from the group consisting
3 of a plasmid and a virus.

1 17. A cell comprising the expression vector of
2 claim 15.

1 18. A method of increasing expression of Plasmodium
2 sp. chitinase in a host cell, said method comprising:
3 introducing the nucleic acid molecule of claim 1
4 into the cell; and
5 allowing said cell to express said nucleic acid
6 molecule resulting in the production of Plasmodium sp.
7 chitinase in said cell.

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1 19. A method of screening a substance for the
2 ability of the substance to modify Plasmodium sp.
3 chitinase function, said method comprising:
4 introducing the nucleic acid molecule of claim 1
5 into a host cell;
6 expressing said Plasmodium sp. chitinase encoded by
7 said nucleic acid molecule in the host cell;
8 exposing the cell to a substance; and
9 evaluating the exposed cell to determine if the
10 substance modifies the function of the Plasmodium sp.
11 chitinase.

1 20. The method of claim 19 wherein said evaluation
2 comprises monitoring the expression of Plasmodium sp.
3 chitinase.

1 21. A method of obtaining DNA encoding a Plasmodium
2 sp. chitinase, said method comprising:
3 selecting a DNA molecule encoding a Plasmodium sp.
4 chitinase, said DNA molecule having a nucleotide sequence
5 as shown in SEQ ID NO:1 or SEQ ID NO:2;
6 designing an oligonucleotide probe for a Plasmodium
7 sp. chitinase based on the nucleotide sequence of the
8 selected DNA molecule;
9 probing a genomic or cDNA library of an organism
10 with the oligonucleotide probe; and
11 obtaining clones from said library that are
12 recognized by said oligonucleotide probe, so as to obtain
13 DNA encoding a Plasmodium sp. chitinase.

1 22. A method of obtaining DNA encoding a Plasmodium
2 sp. chitinase, said method comprising:

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3 selecting a DNA molecule encoding a Plasmodium sp.
4 chitinase, said DNA molecule having a nucleotide sequence
5 as shown in SEQ ID NO:1 of SEQ ID NO:2;
6 designing degenerate oligonucleotide primers based
7 on the nucleotide sequence of the selected DNA molecule;
8 and
9 utilizing said oligonucleotide primers in a
10 polymerase chain reaction on a DNA sample to identify
11 homologous DNA encoding a Plasmodium sp. chitinase in
12 said sample.

1 23. An isolated nucleic acid molecule encoding a
2 Plasmodium sp. chitinase, said nucleic acid molecule
3 encoding a first amino acid sequence having at least 90%
4 amino acid identity to a second amino acid sequence, said
5 second amino acid sequence as shown in SEQ ID NO:3 or SEQ
6 ID NO:4.

1 24. A DNA oligomer capable of hybridizing to the
2 nucleic acid molecule of claim 1.

1 25. A method of detecting presence of a Plasmodium
2 sp. chitinase in a sample, said method comprising:
3 contacting a sample with the DNA oligomer of claim
4 24, wherein said DNA oligomer hybridizes to any of said
5 Plasmodium sp. chitinase present in said sample, forming
6 a complex therewith; and
7 detecting said complex, thereby detecting presence
8 of a Plasmodium sp. chitinase in said sample.

1 26. The method of claim 25 wherein said DNA
2 oligomer is labeled with a detectable marker.

1 27. An isolated Plasmodium sp. chitinase.

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1 28. The Plasmodium sp. chitinase of claim 27
2 wherein said Plasmodium sp. chitinase is encoded by a
3 nucleotide sequence as shown in SEQ ID NO:1 or SEQ ID
4 NO:2.

1 29. The Plasmodium sp. chitinase of claim 27
2 wherein said Plasmodium sp. chitinase is encoded by an
3 amino acid sequence as shown in SEQ ID NO:3 or SEQ ID
4 NO:4.

1 30. An isolated Plasmodium sp. chitinase encoded by
2 a first amino acid sequence having at least 90% amino
3 acid identity to a second amino acid sequence, said
4 second amino acid sequence as shown in SEQ ID NO:3 or SEQ
5 ID NO:4.

1 31. An antibody or fragment thereof specific for
2 the Plasmodium sp. chitinase of claim 30.

1 32. The antibody of claim 31 wherein said antibody
2 comprises a monoclonal antibody.

1 33. The antibody of claim 31 wherein said antibody
2 comprises a polyclonal antibody.

1 34. A method of detecting presence of a Plasmodium
2 sp. chitinase in a sample, said method comprising:

3 contacting a sample with the antibody or fragment
4 thereof of claim 31, wherein said antibody or fragment
5 thereof binds to any of said Plasmodium sp. chitinase
6 present in said sample, forming a complex therewith; and

7 detecting said complex, thereby detecting presence
8 of a Plasmodium sp. chitinase in said sample.

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1 35. The method of claim 34 wherein said antibody or
2 fragment thereof is labeled with a detectable marker.

1 36. A method of producing an antibody specific for
2 a Plasmodium sp. chitinase in a host, the method
3 comprising:

4 selecting the isolated Plasmodium sp. chitinase of
5 claim 27 or an antigenic portion thereof; and

6 introducing the selected Plasmodium sp. chitinase or
7 antigenic portion thereof into a host to induce
8 production of an antibody specific for Plasmodium sp.
9 chitinase in the host.

1 37. A composition comprising the Plasmodium sp.
2 chitinase of claim 27 or an antigenic portion thereof and
3 a compatible carrier.

1 38. A method of preventing transmission of malaria
2 by a mosquito feeding on a subject that may harbor
3 Plasmodium sp. organisms, the method comprising
4 administering to the subject an amount of the composition
5 of claim 37 effective to induce production of an antibody
6 specific for Plasmodium sp. chitinase in the subject,
7 wherein the antibody inhibits Plasmodium sp. chitinase
8 and is transferred to a mosquito feeding on the subject
9 thereby preventing infection of the mosquito by
10 Plasmodium sp. organisms that may be harbored in the
11 subject.

1 39. A method of screening a substance for the
2 ability of the substance to modify Plasmodium sp.
3 chitinase function, the method comprising:

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4 exposing the isolated Plasmodium sp. chitinase of
5 claim 27 to a substance; and

6 evaluating the exposed chitinase to determine if the
7 substance modifies the function of the Plasmodium sp.
8 chitinase.

1 40. A method of preventing infection of mosquitoes
2 by Plasmodium sp., the method comprising exposing the
3 Plasmodium sp. to an amount of a compound effective to
4 interfere with function of Plasmodium sp. chitinase,
5 thereby preventing infection of the mosquitoes by the
6 Plasmodium sp.

1 41. The method of claim 40 wherein the compound
2 interferes with function of Plasmodium sp. chitinase by
3 reducing Plasmodium sp. chitinase gene expression.

1 42. The method of claim 41 wherein the compound is
2 an oligonucleotide targeted to the Plasmodium sp.
3 chitinase gene.

1 43. The method of claim 40 wherein the compound
2 interferes with function of the Plasmodium sp. chitinase
3 by inhibiting the function of Plasmodium sp. chitinase.

1 44. A method of preventing transmission of malaria
2 by a mosquito feeding on a subject that may harbor
3 Plasmodium sp. organisms, the method comprising
4 administering to the subject an amount of a compound
5 effective to interfere with function of Plasmodium sp.
6 chitinase in the subject, wherein the compound is
7 transferred to a mosquito feeding on the subject thereby
8 preventing infection of the mosquito by Plasmodium sp.
9 organisms that may be harbored in the subject.

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1 45. A method of preventing transmission of malaria
2 by a mosquito that ingests Plasmodium sp. organisms, the
3 method comprising introducing into the mosquito an amount
4 of a compound effective to interfere with function of
5 Plasmodium sp. chitinase thereby preventing infection of
6 the mosquito by ingested Plasmodium sp. organisms.

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